

1           **SILICON-CONTAINING RESIST SYSTEMS WITH CYCLIC KETAL**  
2                           **PROTECTING GROUPS**

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4                           **ABSTRACT**

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6   Inventive silsesquioxane polymers are provided, and photoresist compositions  
7   that contain such silsesquioxane polymers are provided in which at least a  
8   portion of the silsesquioxane polymer contains fluorinated moieties, and at least  
9   a portion of the silsesquioxane polymer contains pendant solubility inhibiting  
10   cyclic ketal acid-labile moieties that have low activation energy for acid-catalyzed  
11   cleaving. The inventive polymer also contains pendant polar moieties that  
12   promote alkaline solubility of the resist in aqueous alkaline solutions. The  
13   inventive polymers are particularly useful in positive resist compositions. The  
14   invention encompasses methods of using such photoresist compositions in  
15   forming a patterned structure on a substrate, and particularly multilayer (e.g.  
16   bilayer) photolithographic methods, which methods are capable of producing high  
17   resolution images at wavelengths such as 193 nm and 157 nm.

18